What is claimed is:

1. A method for determining a response characteristic of an nth order linear system, comprising:

supplying an input signal to the nth order linear system;

measuring an output signal of the nth order linear system that occurs in response to the input signal;

constructing a variance record of a non-uniformly sampled measurable quantity extracted from the output signal; and

obtaining the response characteristic of the nth order linear system based on a mathematical relationship of the variance record of the measurable quantity and a response function.

2. The method of claim 1, wherein the nth order linear system is a phase locked loop, and wherein supplying the input signal comprises supplying a train of clock pulses to the phase locked loop.

3. The method of claim 2, wherein the output signal is a train of clock pulses and the measurable quantity is jitter of the output signal, and wherein constructing a variance record comprises constructing a record of the jitter variance of the output signal as a function of time.

4. The method of claim 1, wherein the response function is a transfer function and where obtaining the response characteristic comprises generating an expression for the transfer function of the nth order linear system by manipulating transfer function parameters to fit a variance model to the variance record.

5. The method of claim 4, wherein generating an expression for the transfer function comprises fitting a variance model to the variance record by manipulating a natural frequency parameter and a damping factor parameter of the transfer function to find a best fit for a the variance of the measurable quantity.

6. The method of claim 1, wherein the response function is a transfer function and wherein obtaining the response characteristic comprises finding a power spectral density for the nth order linear system by numerically solving the mathematical relationship between the variance record and the response function.

7. The method of claim 6, wherein numerically solving the mathematical relationship involves finding a numerical solution using a filter bank and corresponding frequency bands.

8. The method of claim 3, wherein the response function is a transfer function and wherein obtaining the response characteristic comprises generating an expression for the transfer function of the phase locked loop including fitting a jitter variance model to the jitter variance record and determining a damping factor and natural frequency for the transfer function that are present in the jitter variance model and that best fit the jitter variance model to the jitter variance record.

9. The method of claim 4, wherein obtaining the response characteristic further comprises deriving operational parameters from the transfer function.

10. The method of claim 4, wherein obtaining the response characteristic further comprises deriving noise processes from the mathematical relationship between the transfer function and input and output noise power spectral density.

11. The method of claim 4, wherein generating an expression for the transfer function comprises analytically solving for the natural frequency and damping factor based on the complex or real poles of the linear system.

12. The method of claim 6, wherein the mathematical relationship involves a Fredholm integral and numerically solving the mathematical relationship involves finding a numerical solution to the Fredholm integral.

13. A system for determining a response characteristic of an nth order linear system, comprising:

a measurement device configured to receive and measure an output signal resulting from supplying an input signal to the nth order linear system; and

a processing device configured to compute the response characteristic of the nth order linear system from the output signal measurement by constructing a variance record of a non-uniformly sampled quantity measured by the measurement device and obtaining the response characteristic based on a mathematical relationship of the variance record to a response function.

14. The system of claim 13, wherein the nth order system is a phase locked loop, and wherein the input signal is a train of clock pulses.

15. The system of claim 14, wherein the output signal is a train of clock pulses, the measurable quantity is jitter of the output signal, and the variance record is a record of jitter variance of the output signal as a function of time.

16. The system of claim 13, wherein the response function is a transfer function and wherein the processing device is configured to generate an expression for the transfer function of the nth order linear system by fitting a variance model to the variance record and to determine parameters for the transfer function that also appear in the variance model and that produce the best fit for the variance model relative to the variance record of the measurable quantity.

17. The system of claim 16, wherein the processing device is configured to derive operational parameters from the transfer function and derive noise processes from a mathematical relationship between the transfer function and input and output noise power spectral density.

18. The system of claim 13, wherein the response characteristic is a power spectral density for the nth order linear system and wherein the processing device is further configured to obtain the response characteristic from a numerical solution to the mathematical relationship.

19. A computer program product comprising computer executable instructions for determining a response characteristic of an nth order linear system, the computer executable instructions comprising:

constructing a variance record of a non-uniformly sampled measurable quantity extracted from an output signal of the nth order linear system; and

obtaining the response characteristic of the nth order linear system from a mathematical relationship between the variance record of the measurable quantity and a response function of the nth order linear system.

20. The computer program product of claim 19, wherein the output signal is a train of clock pulses and the measurable quantity is jitter of the output signal, and wherein constructing a variance record comprises constructing a record of the jitter variance of the output signal as a function of time.

21. The computer program product of claim 20, wherein the response function is a transfer function, the computer executable instructions further comprising finding a jitter variance model that matches the jitter variance record by fitting a generic variance model to the jitter variance record.

22. The computer program product of claim 20, wherein the response function is a transfer function and wherein obtaining the response characteristic further comprises deriving operational parameters from the parameters of the transfer function.

23. The computer program product of claim 19, wherein the response characteristic is a power spectral density for the nth order linear system and wherein obtaining the response characteristic further comprises finding a numerical solution to the mathematical relationship.

24. A method for determining a response function of an nth order linear system, comprising:

supplying an input signal to the nth order linear system;

measuring an output signal of the nth order linear system that occurs in response to the input signal;

constructing a variance record of a measurable quantity extracted from the output signal; and

fitting a model containing parameters of the response function to a variance record based set of data by manipulating the parameters to provide a best fit of the model to the set of data.

25. The method of claim 24, wherein fitting a model further comprises:

finding a generic variance record model containing transfer function parameters;

and manipulating the transfer function parameters to fit the variance record model to the variance record.

26. The method of claim 24, wherein fitting a model further comprises:

assuming a pole-zero function and pole-zero locations;

solving the mathematical relationship including the pole-zero function to produce a model variance record;

comparing the model variance record to the constructed variance record; and

repetitively altering the pole-zero locations and resolving the mathematical relationship until the model variance record is best fit to the constructed variance record.

27. The method of claim 24, wherein fitting a model further comprises:

converting the constructed variance record to a derived power spectral density record;

assuming a pole-zero function; and

manipulating pole-zero locations of the pole-zero function to fit the pole-zero function to the power spectral density record.

28. A method for determining an error estimate of a response function estimated for an nth order linear system, comprising:

supplying an input signal to the nth order linear system;

measuring an output signal of the nth order linear system that occurs in response to the input signal;

constructing a variance record of a measurable quantity extracted from the output signal;

estimating the response function by fitting a model containing parameters of the response function to a variance record based set of data by manipulating the parameters to provide a best fit of the model to the set of data; and

measuring a residue between the model and the set of data to find the error estimate of the response function estimated for the nth order linear system.

29. The method of claim 28, wherein the variance record based set of data is a variance record, and wherein fitting a model further comprises:

finding a generic variance record model containing transfer function parameters;

and manipulating the transfer function parameters to fit the variance record model to the variance record.

30. The method of claim 28, wherein the variance record based set of data is a variance record, and wherein fitting a model further comprises:

assuming a pole-zero function and pole-zero locations;

solving the mathematical relationship including the pole-zero function to produce a model variance record;

comparing the model variance record to the constructed variance record; and

repetitively altering the pole-zero locations and resolving the mathematical relationship until the model variance record is best fit to the constructed variance record.

31. The method of claim 28, wherein the variance record based set of data is a variance record, and wherein fitting a model further comprises:

converting the constructed variance record to a derived power spectral density record;

assuming a pole-zero function; and

manipulating pole-zero locations of the pole-zero function to fit the pole-zero function to the power spectral density record.

32. A method for finding a response characteristic of an nth order linear system, comprising:

supplying an input signal to the nth order linear system;

obtaining a power spectral density record for an output signal of the nth order linear system produced in response to the input signal;

assuming a pole-zero function; and

manipulating pole-zero locations of the pole-zero function to fit the pole-zero function to the power spectral density record.

33. The method of claim 32, wherein obtaining the power spectral density further comprises:

constructing a variance record of a measurable quantity from the output signal; and

converting the variance record to a power spectral density record according to a mathematical relationship between the variance record and a response function of the nth order linear system.

34. The method of claim 33, wherein the mathematical relationship is a Fredholm integral and wherein converting the variance record comprises solving the Fredholm integral by applying filter banks dedicated to specific frequency bands.